School Sustainability Grant 2012 – 2013

Creekside Junior High

Pearl River, LA

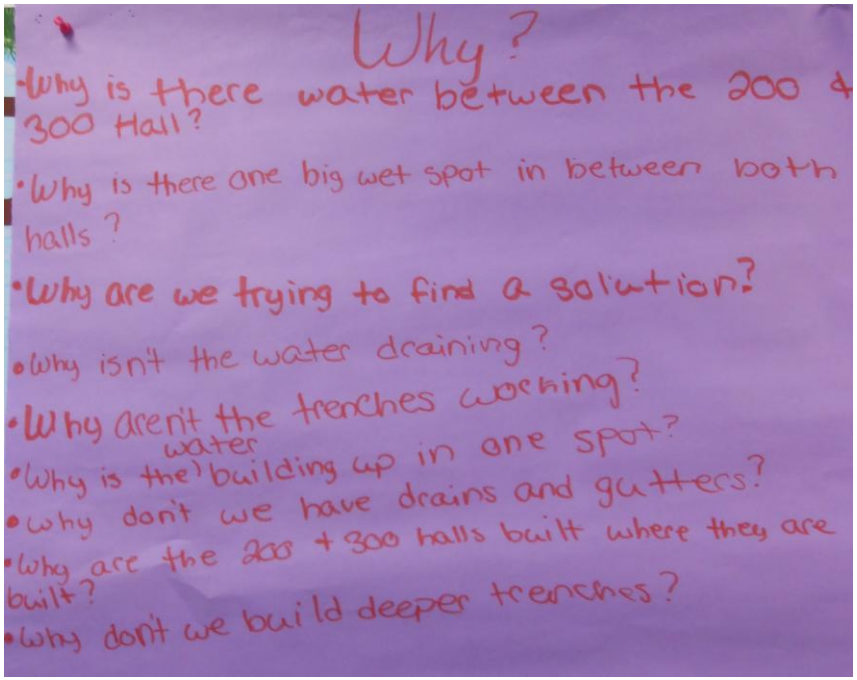
GROWING IN THE 21ST CENTURY

How can we reduce the amount of flooding between the 200 and 400 halls?

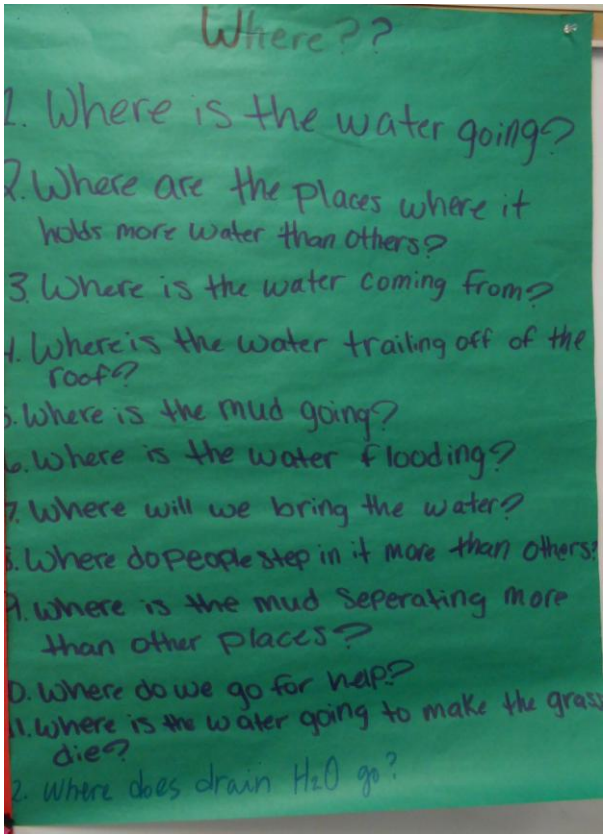
This is the question that was asked at the beginning of this project. From here, students embarked on a creative problem solving activity to understand the problem and propose possible solutions to the problem. The picture to the right shows the results of a brainstorming session intended to help the students more clearly understand the problem. At each stage of the process students would use divergent thinking to get ideas and convergent thinking to evaluate and choose a solution.

Understanding the Problem

WHY?

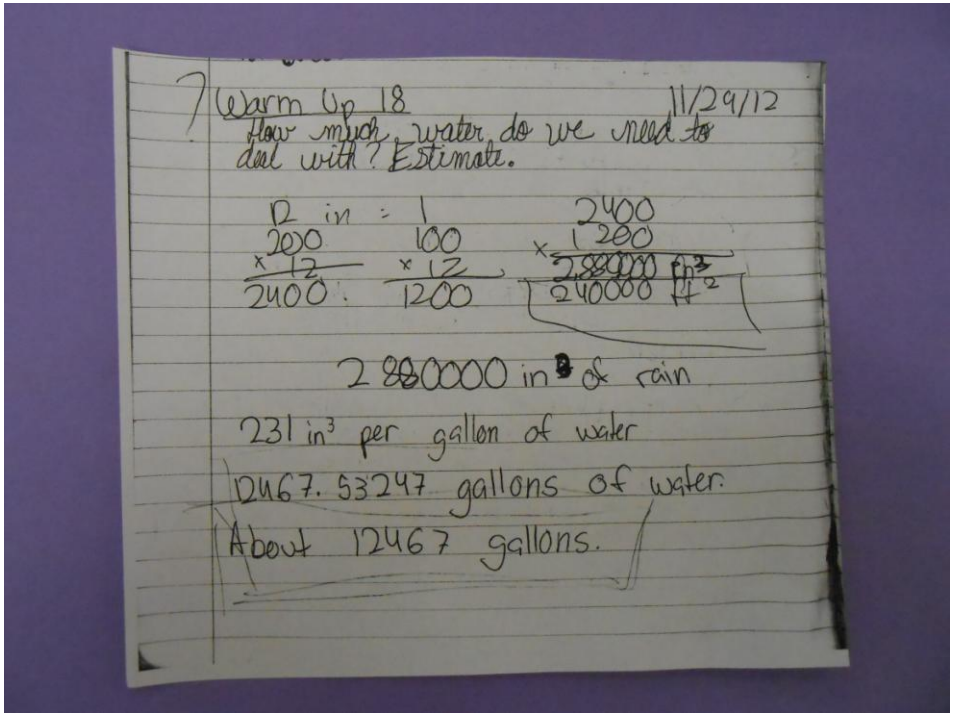


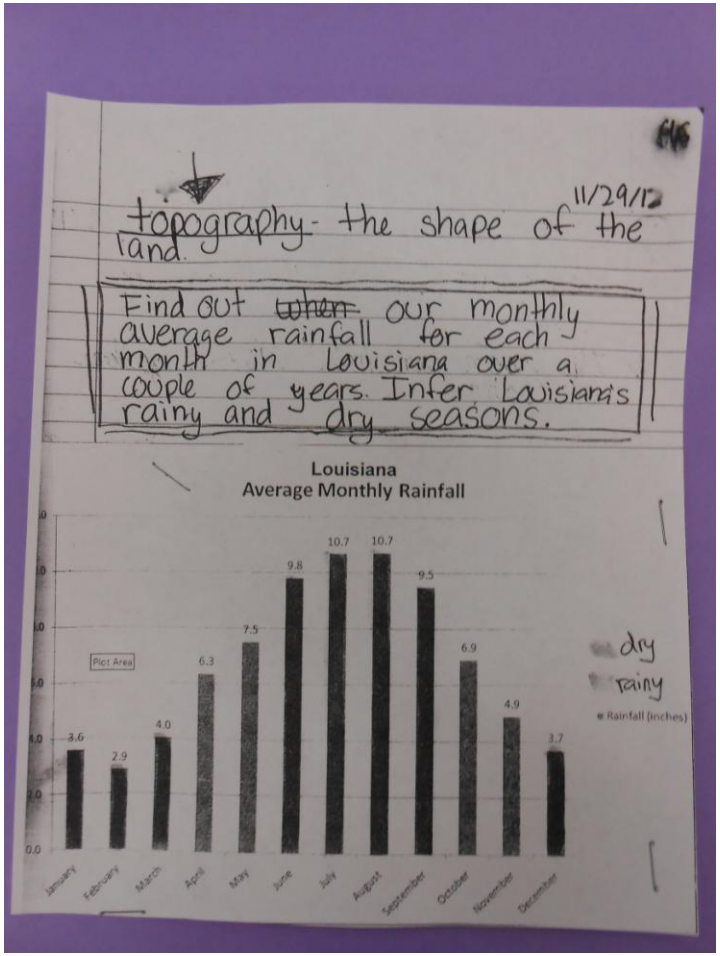
WHERE?



Student Work

The following slides show work taken from one student's journal.

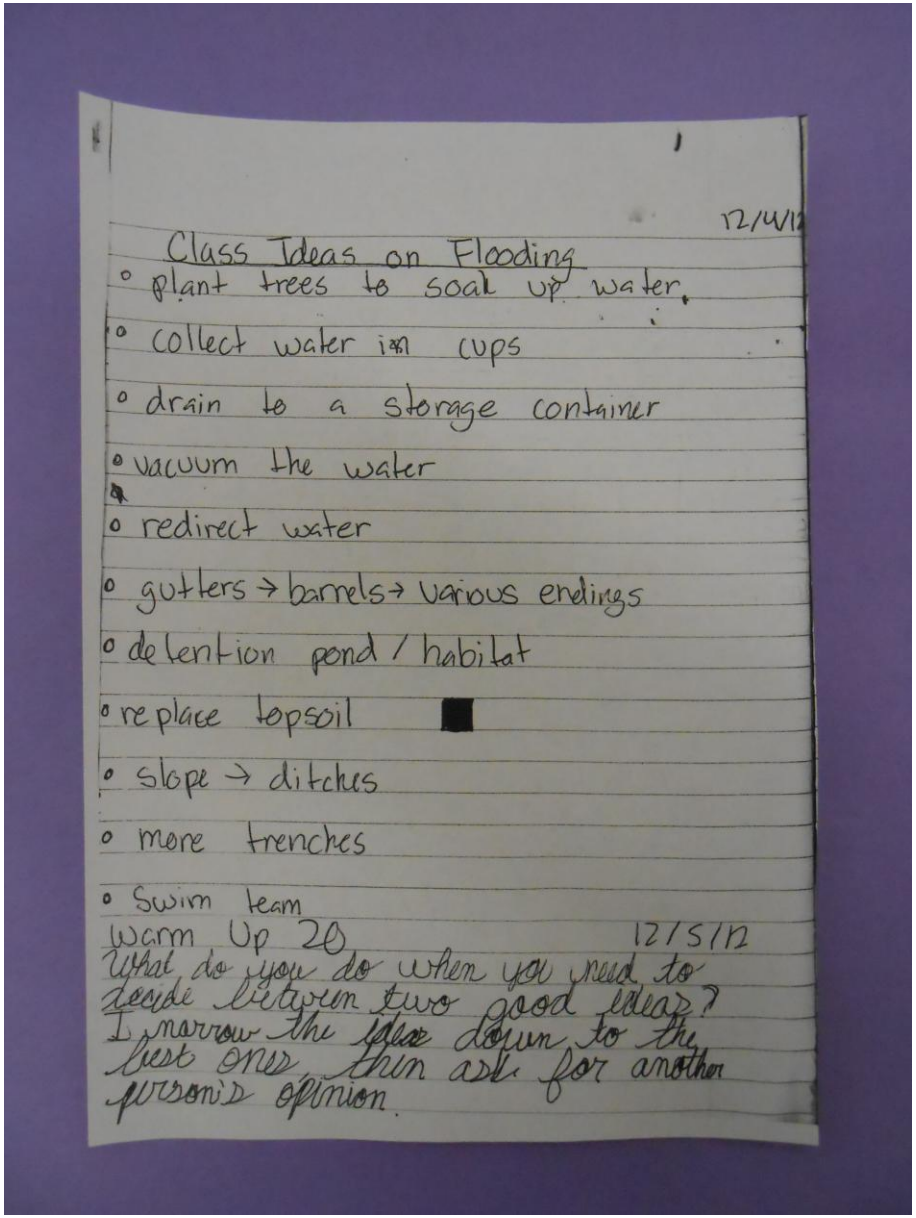




Calculating Roof Runoff Volume

Student Work

Further thoughts..



12/4/12

Class Ideas on Flooding

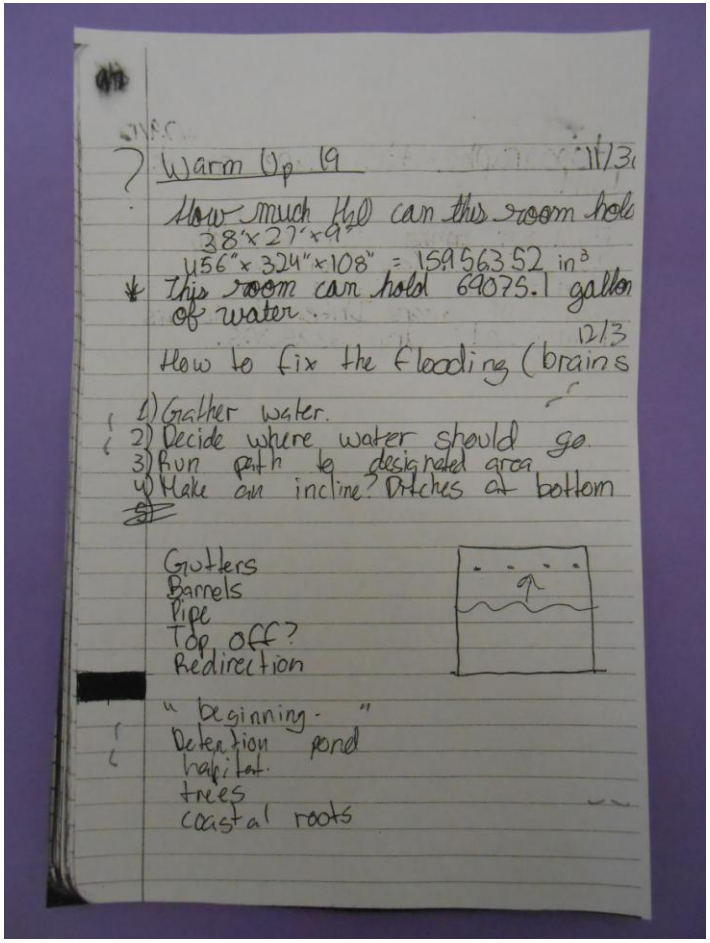
- plant trees to soak up water.
- collect water in cups
- drain to a storage container
- vacuum the water
- redirect water
- gutters → barrels → various endings
- detention pond / habitat
- replace topsoil
- slope → ditches
- more trenches
- swim team

Warm Up 20 12/5/12

What do you do when you need to decide between two good ideas? I narrow the ideas down to the best ones then ask for another person's opinion.

Student Work

Thinking it through.



Warm Up 19 11/3

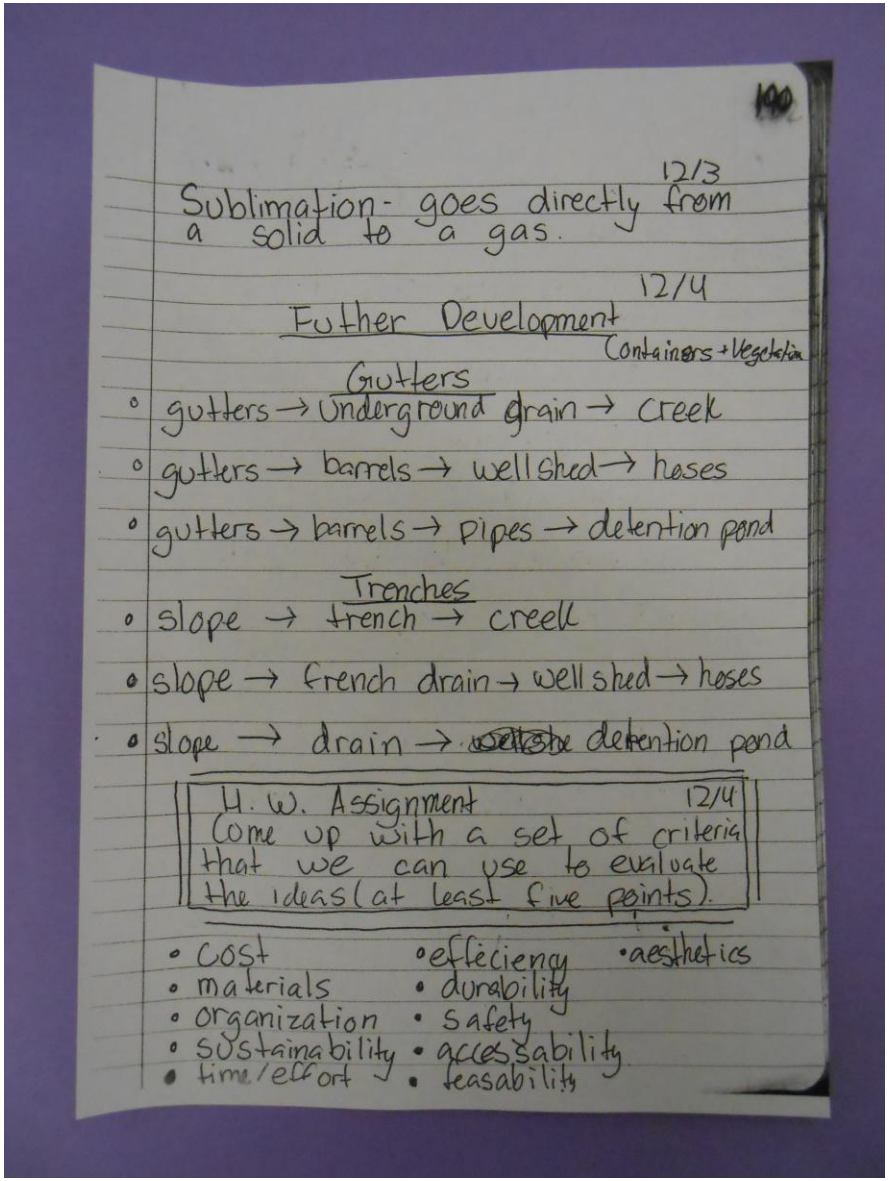
How much H2O can this room hold
38'x27'x9'
456"x324"x108" = 159563.52 in³
This room can hold 69075.1 gallon of water.

12/3
How to fix the flooding (brains

1) Gather water.
2) Decide where water should go.
3) Run path to designated area
4) Make an incline? Ditches at bottom

Gutters
Barrels
Pipe
Top off?
Redirection

"beginning-"
Detention pond
habitat
trees
coastal roots



12/3
Sublimation- goes directly from a solid to a gas.

12/4
Futher Development
Containers + Vegetation

Gutters
- gutters → underground drain → creek
- gutters → barrels → well shed → hoses
- gutters → barrels → pipes → detention pond

Trenches
- slope → trench → creek
- slope → french drain → well shed → hoses
- slope → drain → ~~water~~ detention pond

H. W. Assignment 12/4
Come up with a set of criteria that we can use to evaluate the ideas (at least five points).

- cost
- materials
- organization
- sustainability
- time/effort
- efficiency
- durability
- safety
- accessability
- feasability
- aesthetics

How can we reduce the amount of flooding between the 200 and 400 halls?

After several weeks of brainstorming, researching, discussing, and learning about global sustainability, water conservation, and point and nonpoint pollution, these possible solutions were proposed and then organized into categories.

Gutters

Gutters

Gutters to pipes to drums to well shed to hoses

Gutters to runoff to barrel to well shed to hoses

Add gutters

Gutters to barrels

Gutters to piping to containers

Gutters to containers to filter to water fountains / sprinklers / etc

Gutters to downspouts to tanks to garden to filtration system to school

Gutter to trench to pond

Gutters to funnels to pipes to collection tanks to cafeteria / Coastal Roots / or other needed places

Trenches

Dig trench to pond

Dig more trenches

French drain

Trench downhill under sidewalk to pond

Ditches

Alter slope of land

Make it flow somewhere else

Put more soil and grass to level ground

Slope ground and put something to collect water at end of slope

Slope land to French drain to well shed to hoses

Slope to one drain

Slope land toward a drai n to a container to a garden

Containers

Collect water in 1000 cups

Put out gallon buckets

Containers along the roof connected to pipes

Collect water in containers

Soak Up

Plant trees to soak up water

Absorb water with sponges

Absorbent material

Other

Make a pool and form the CSJH swim team

Collect to barrels to pipe to detention pond to habitat

Collect to barrels to pipe to creek

Funnel to pipe to river

Make pond between buildings

Collect water from existing gullies

Drain where water is puddling

Cover the area that floods

Collected water to school gardens / generate electricity

More drains that lead to a storage container

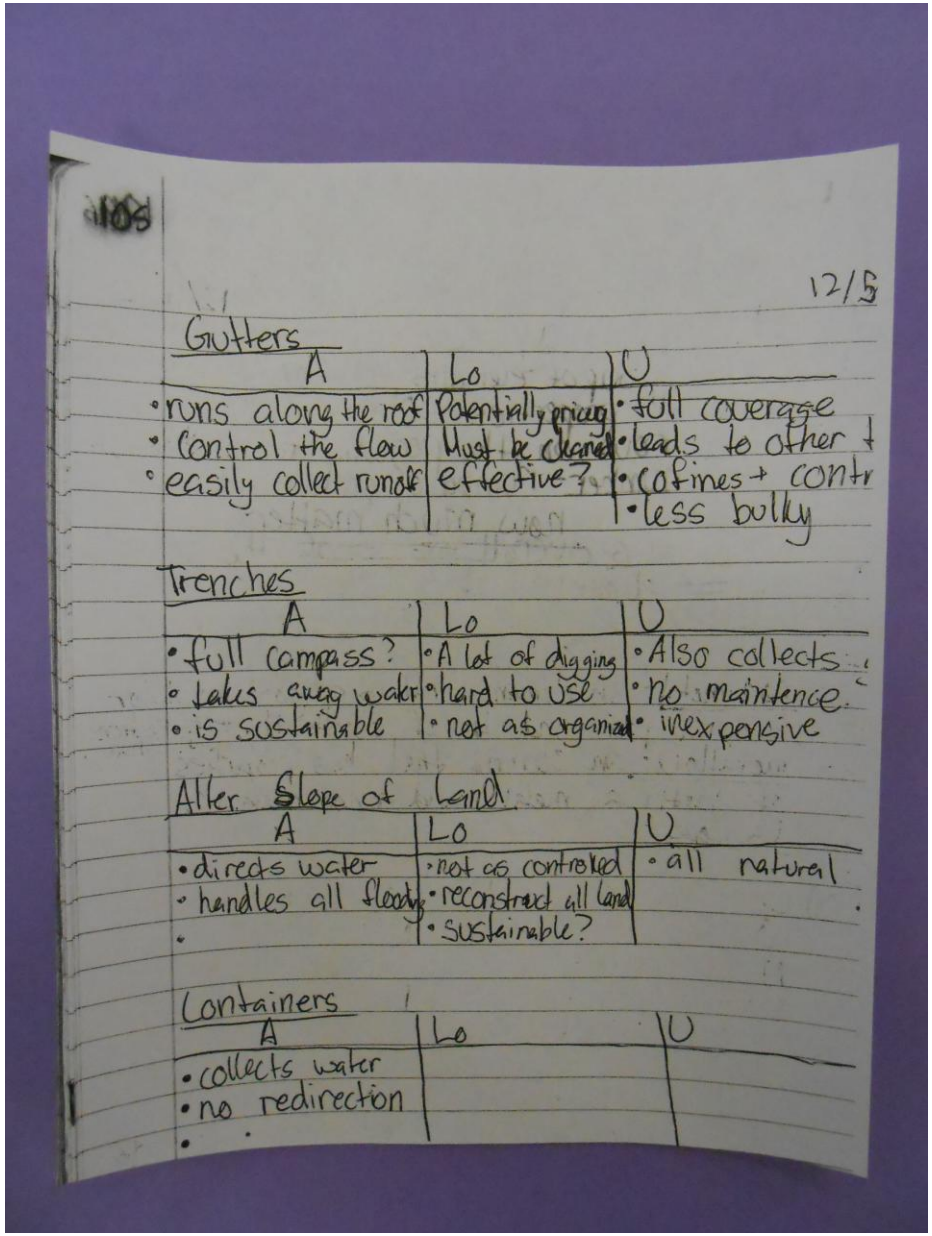
Vacuum the water

Replace topsoil with clay and grass

Lay concrete 5' under the ground then replace Earth materials

Evaluating the Options

Students were encouraged to use different ways to evaluate options. In this case students considered the advantages, limitations, and unique features of different water catchment systems.



12/5

Gutters

A	Lo	U
• runs along the roof • control the flow • easily collect runoff	Potentially pricey Must be cleaned effective?	• full coverage • leads to other • cofines + contr • less bulky

Trenches

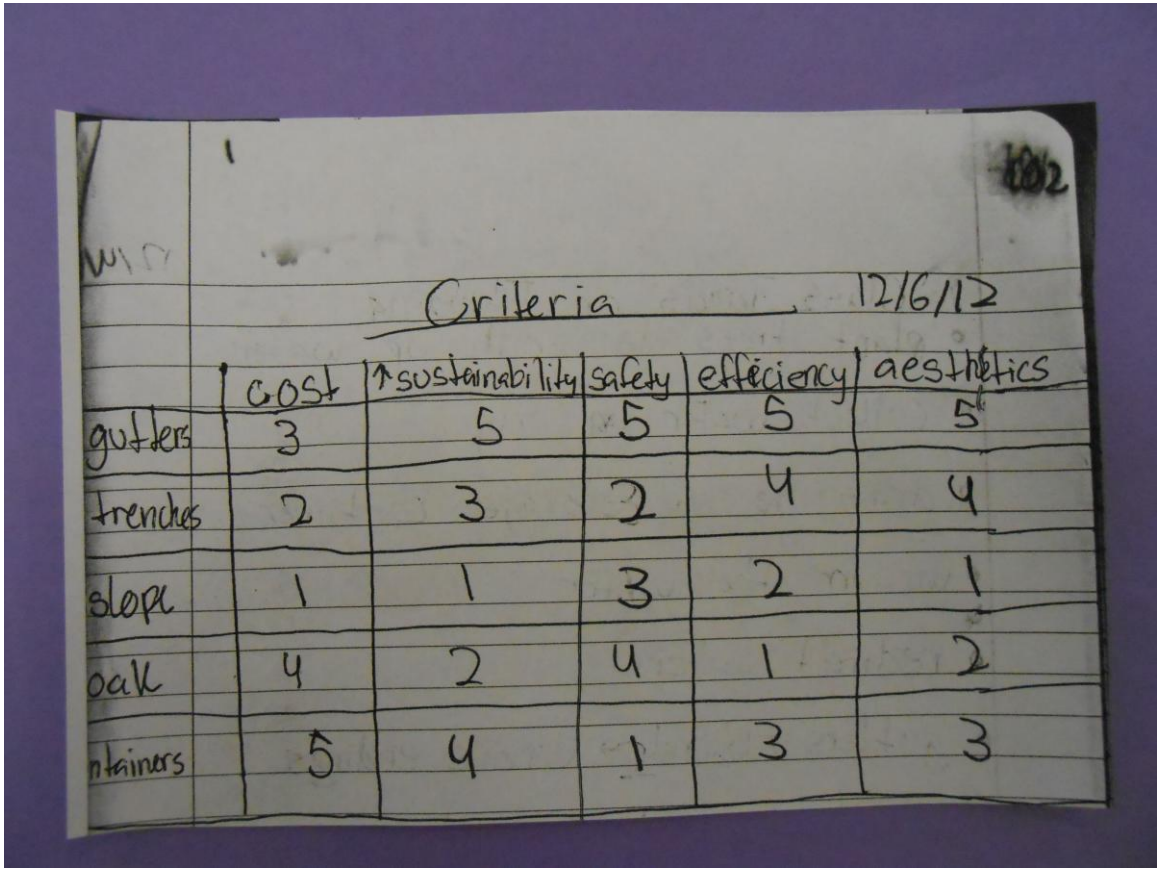
A	Lo	U
• full compass? • takes away water • is sustainable	• A lot of digging • hard to use • not as organized	• Also collects • no maintence • inexpensive

Alter Slope of Land

A	Lo	U
• directs water • handles all floods	• not as controled • reconstruct all land • sustainable?	• all natural

Containers

A	Lo	U
• collects water • no redirection		



Criteria 12/6/12

	cost	↑sustainability	safety	efficiency	aesthetics
gutters	3	5	5	5	5
trenches	2	3	2	4	4
slope	1	1	3	2	1
oak	4	2	4	1	2
ntainers	5	4	1	3	3

Criteria Ranking of Possible Catchment Systems

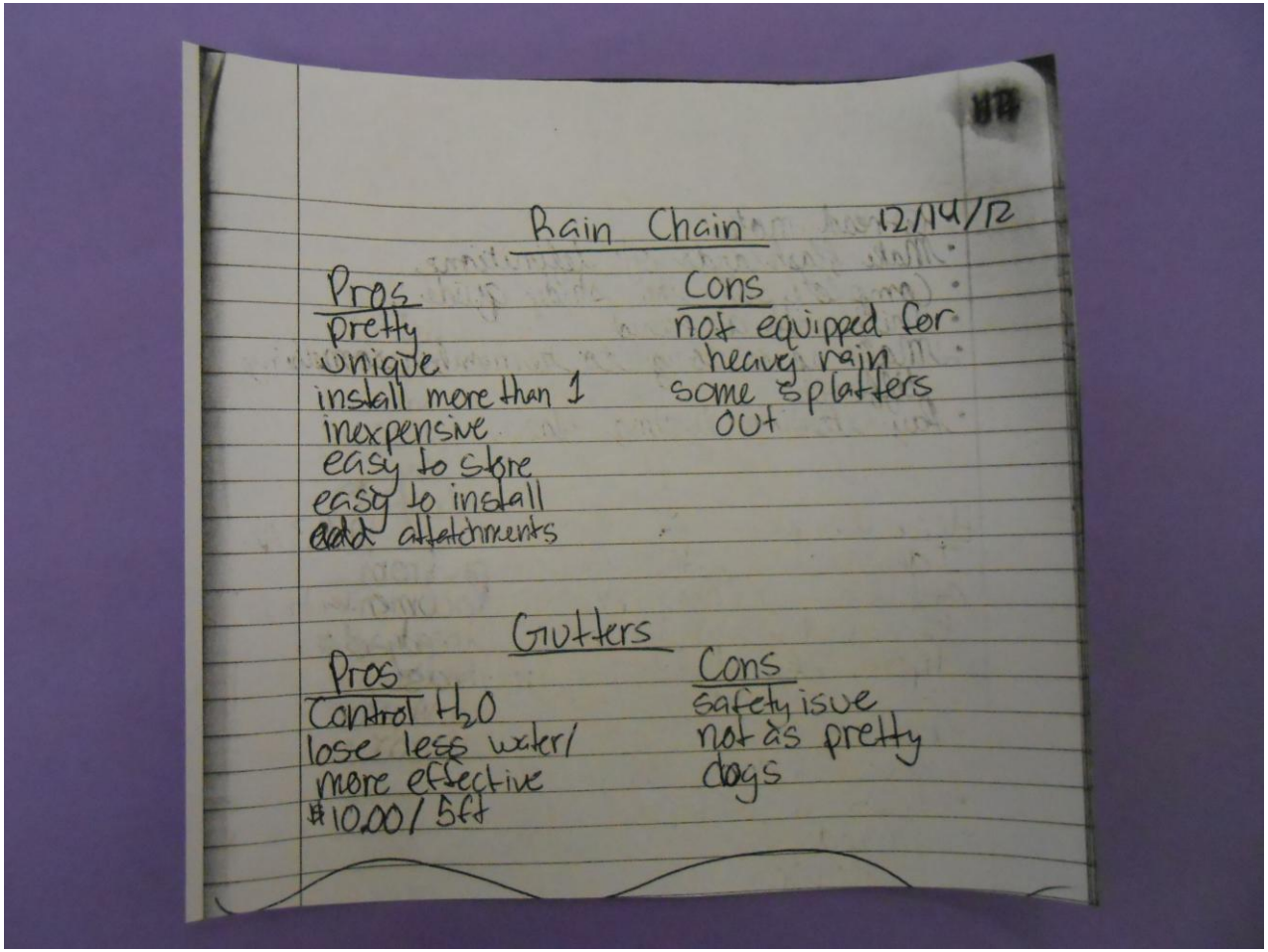
The students established a set of criteria by which to evaluate each type of system. Above is one group's criteria ranking. The students established a set of criteria by which to evaluate each type of system.

	Cost	Effectiveness	Aesthetics	Sustainability	Safety	Total
Gutters	2	5	5	5	5	22
Trenches	4	3	2	2	1	12
Slope	1	2	3	1	3	10
Soaking	3	1	4	3	4	15
Containers	5	4	1	4	2	16

Criteria Ranking of Possible Catchment Systems

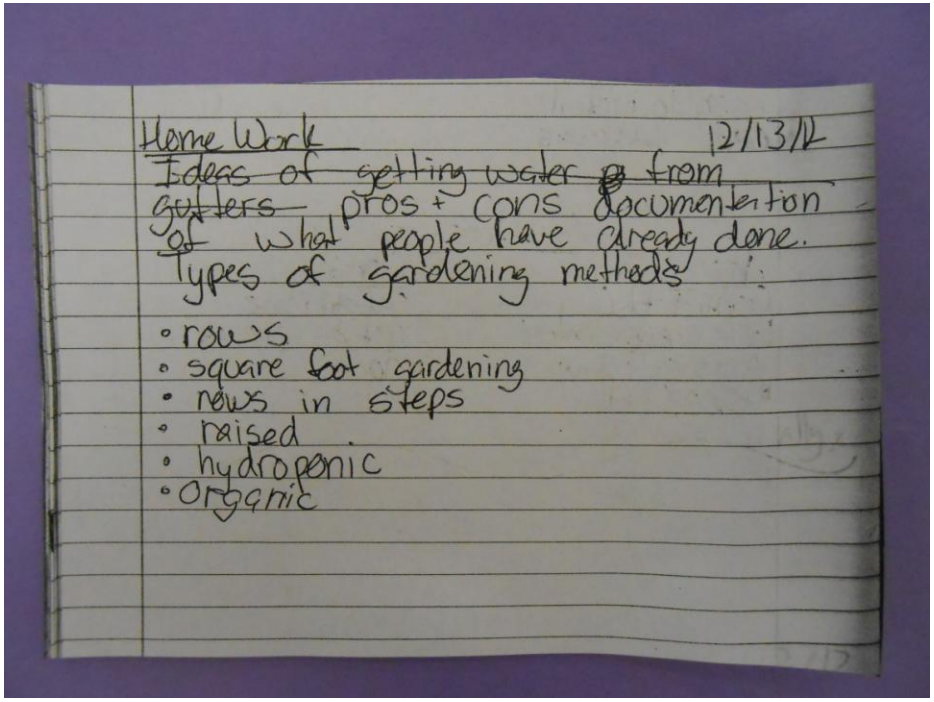
This is the final ranking when done as a class. Gutters received the highest ranking, so it was decided that gutters would be used to catch the rainwater and the water would run into barrels.

Rain Chains or Downspouts?



Which type of garden should we use?

Options



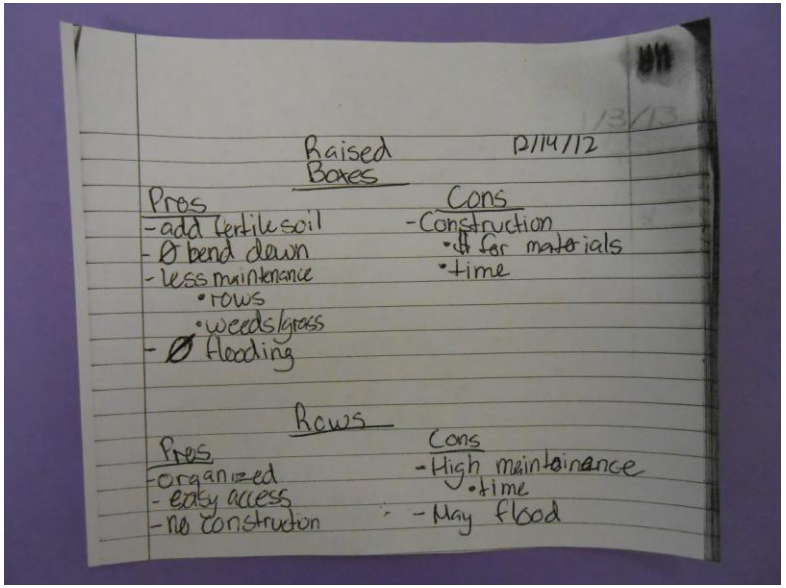
Home Work 12/13/12

Ideas of getting water ~~@~~ from gutters pros + cons documentation of what people have already done.

Types of gardening methods

- rows
- square foot gardening
- rows in steps
- raised
- hydroponic
- Organic

Pros and Cons



Raised Beds 12/14/12

Pros
- add fertile soil
- Ø bend down
- less maintenance
  - rows
  - weeds/grass
- Ø flooding

Cons
- Construction
  - $ for materials
  - time

Rows

Pros
- organized
- easy access
- no construction

Cons
- High maintainance
  - time
- May flood

Water Catchment

Measuring Drip Chain

Installing Main Tank Line

Water Catchment

Assembling Tank Connectors

Tanks & Drip Chains

With 7 collection tanks and 2 main supply tanks, we can catch 9000 liters of rainwater

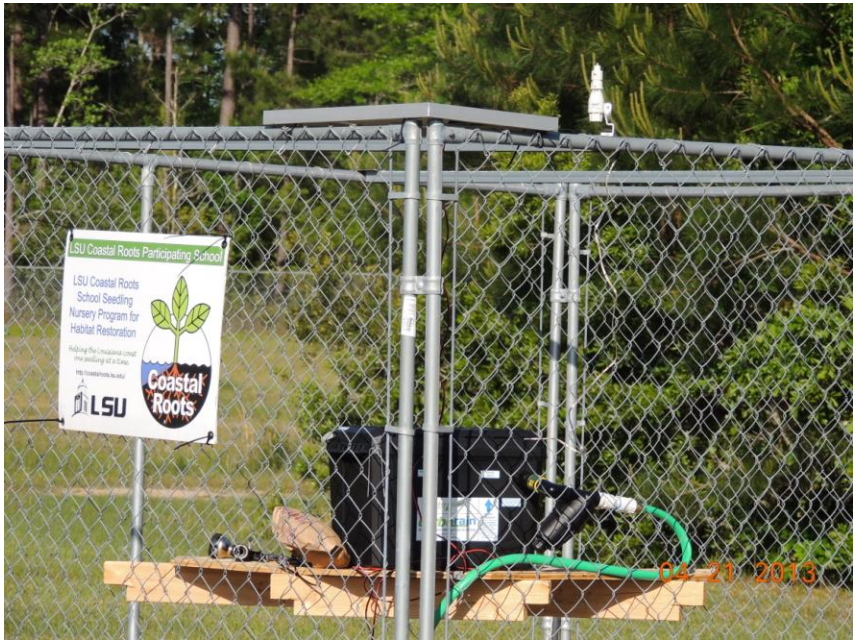
Tunneling to connect collection tanks to main supply tanks

Main Supply Tanks

Connecting to the Solar Pump

It was a long way to the pump!

We keep the solar pump locked in our Coastal Roots yard so no one will damage it. A rain gauge senses when we receive over ¾” of rain in a day and overrides pump settings.



Composting

Our worms didn't like their new home and many escaped the first night!

Preparing more favorable digs

Vermicomposting

Building the Garden

Blocking Weeds

Spreading Soil

Leaf Composting

Setting Up the Bins

Compost Bins

The cafeteria fives us about a five gallon bucket of refuse each day

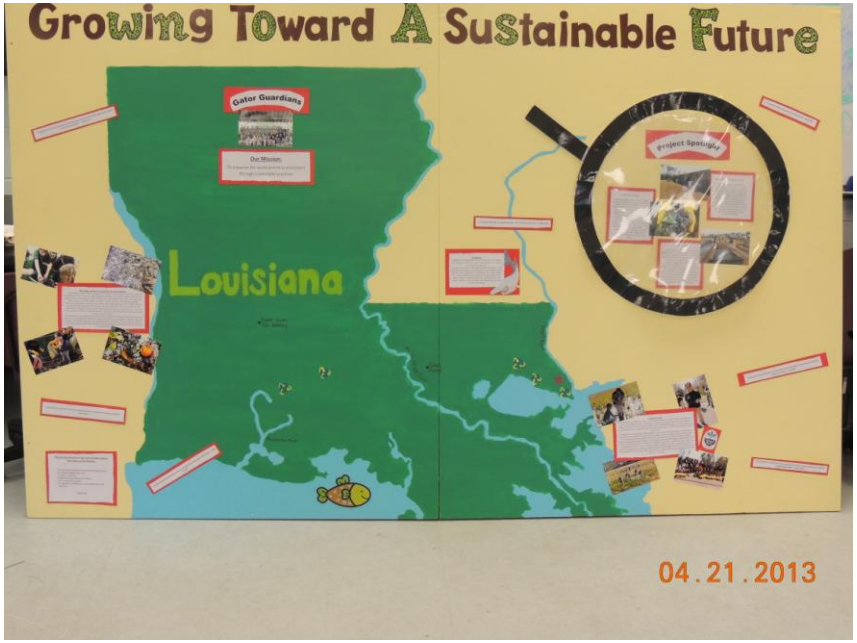
Gardens

Gardens

One of each type of plant has an ID tag that includes a picture, common name and scientific name.

Earth Day Celebration

Overview of All Projects



1st Stop on Tour
What is sustainability?

Earth Day

Explaining Water Catchment

Describing the System

Earth Day

Students demonstrated how to set up a compost bin

Students showed how busy their worms have been

One group’s criteria ranking

Gardening

Explaining square foot gardening, drip irrigation and companion planting

Over 500 students, faculty members, and parents attended Earth Day.

Growing in the 21st Century

Thank you for this awesome opportunity! Most of us had not heard of the term sustainability much less understood what it meant before embarking on this project. We had fun completing this project, and learned more than we anticipated learning!

Mrs. Danjean's 6th, 7th, & 8th grade students

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